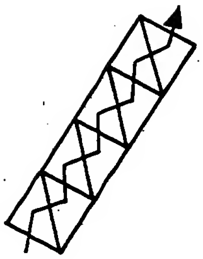
FOR TRIANGLE, ELECTRIC CURRENTS ARE CALCULATED FROM VERTEXES TO OPPOSITE SIDE DIRECTIONS

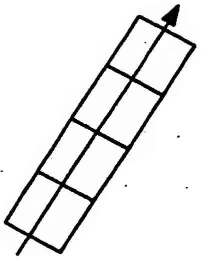
FOR QUADRILATERAL, ELECTRIC CURRENTS IN OPPOSITE SIDE DIRECTIONS ARE CALCULATED

FIG. 1 PRIOR ART



FOR TRIANGLE, ELECTRIC CURRENT FLOWS UNEVENLY, AND PROPAGATION DELAY OCCURS
(ANALYSIS ACCURACY: LOW)

FIG. 2A PRIOR ART



FOR QUADRILATERAL, ELECTRIC CURRENT SMOOTHLY FLOWS
(ANALYSIS ACCURACY: HIGH)

FIG. 2B PRIOR ART

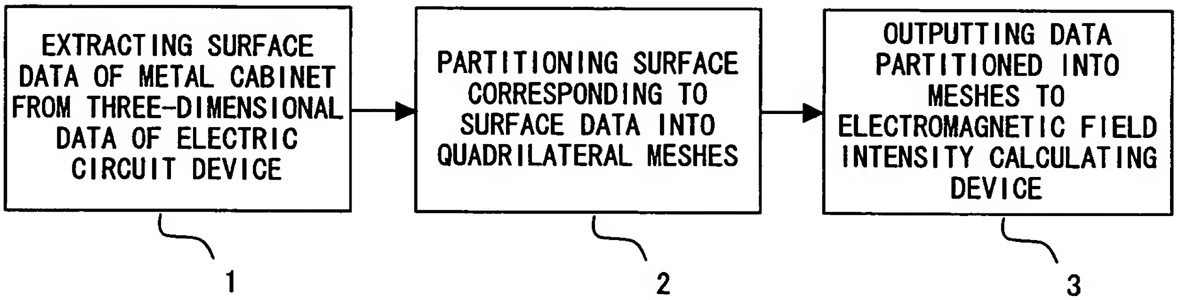

EXTRACTING SURFACE DATA OF METAL CABINET FROM THREE-DIMENSIONAL DATA OF ELECTRIC CIRCUIT DEVICE
PARTITIONING SURFACE CORRESPONDING TO SURFACE DATA INTO QUADRILATERAL MESHES
OUTPUTTING DATA PARTITIONED INTO MESHES TO ELECTROMAGNETIC FIELD INTENSITY CALCULATING DEVICE
1
2
3

FIG. 3

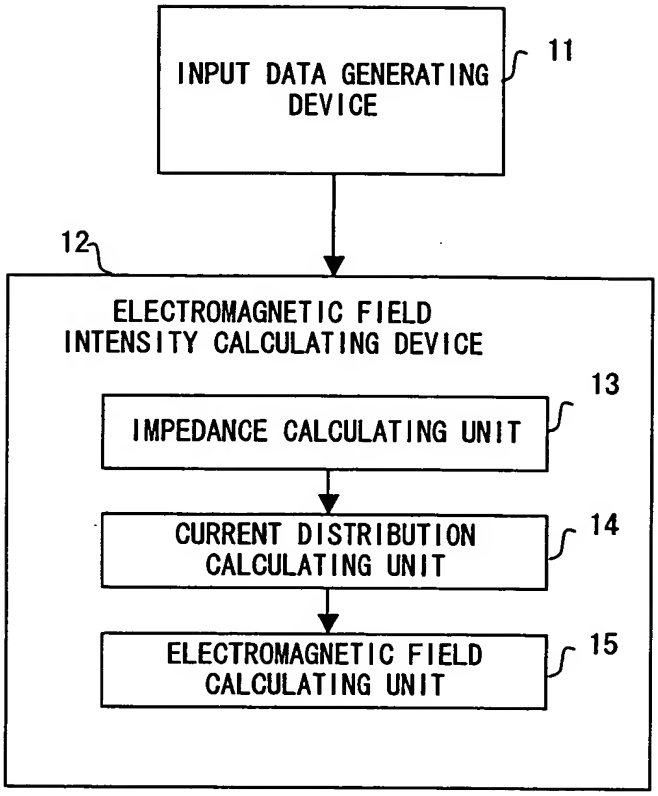
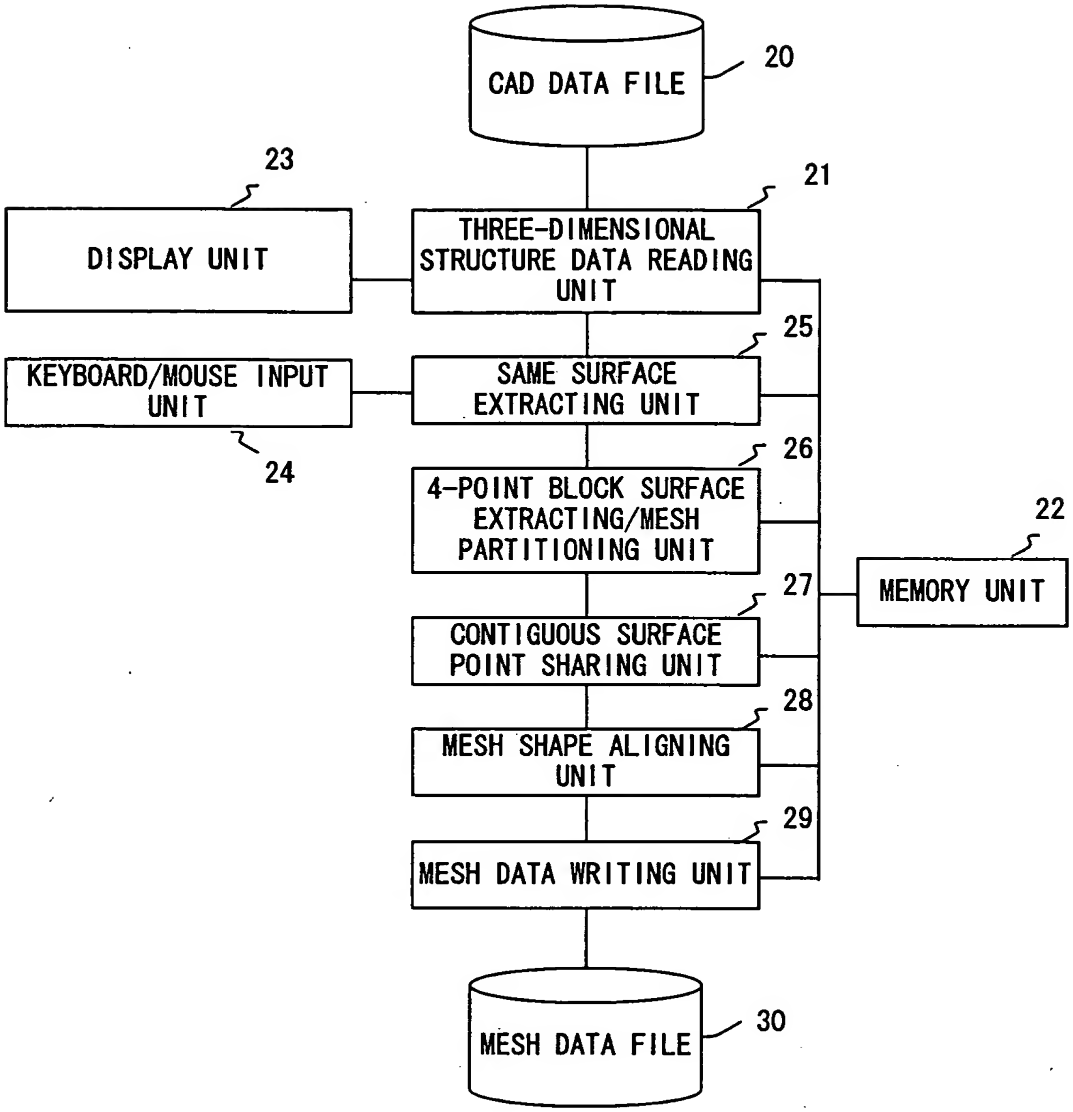

INPUT DATA GENERATING DEVICE
11
12
ELECTROMAGNETIC FIELD INTENSITY CALCULATING DEVICE
13
IMPEDANCE CALCULATING UNIT
14
CURRENT DISTRIBUTION CALCULATING UNIT
15
ELECTROMAGNETIC FIELD CALCULATING UNIT

FIG. 4


CAD DATA FILE
20
THREE-DIMENSIONAL STRUCTURE DATA READING UNIT
21
DISPLAY UNIT
23
SAME SURFACE EXTRACTING UNIT
25
KEYBOARD/MOUSE INPUT UNIT
24
4-POINT BLOCK SURFACE EXTRACTING/MESH PARTITIONING UNIT
26
MEMORY UNIT
22
CONTIGUOUS SURFACE POINT SHARING UNIT
27
MESH SHAPE ALIGNING UNIT
28
MESH DATA WRITING UNIT
29
MESH DATA FILE
30

F I G. 5

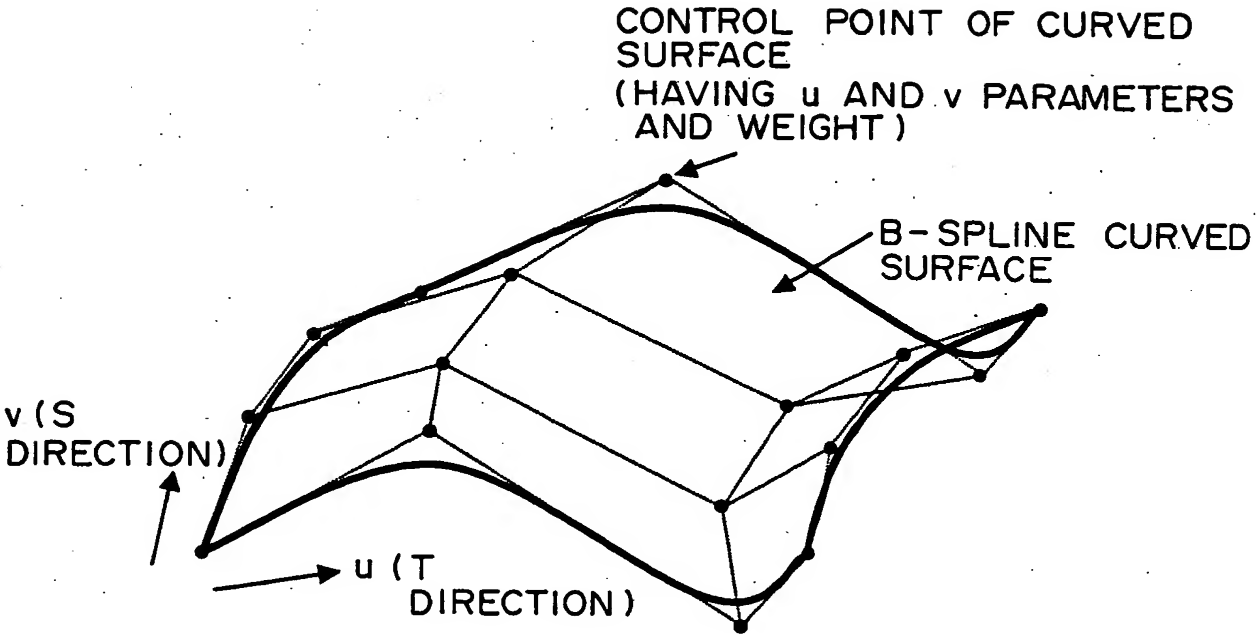

CONTROL POINT OF CURVED SURFACE (HAVING u AND v PARAMETERS AND WEIGHT)
B-SPLINE CURVED SURFACE
v (S DIRECTION)
u (T DIRECTION)

FIG. 6

NAME	SUMMARY
ENTITY ID	SURFACE NUMBER OF B-SPLINE CURVED SURFACE
K1	SUPERSCRIPT OF TOTAL SUM SYMBOL IN S DIRECTION
K2	SUPERSCRIPT OF TOTAL SUM SYMBOL IN T DIRECTION
M1	ORDER OF BASE FUNCTION
M2	ORDER OF BASE FUNCTION
PROP1	PARAMETER 1 INDICATING STATE OF CURVED SURFACE
PROP2	PARAMETER 2 INDICATING STATE OF CURVED SURFACE
PROP3	PARAMETER 3 INDICATING STATE OF CURVED SURFACE
PROP4	PARAMETER 4 INDICATING STATE OF CURVED SURFACE
PROP5	PARAMETER 5 INDICATING STATE OF CURVED SURFACE
S(-M1)	NOT SEQUENCE VALUE IN S DIRECTION
~	
T(-M2)	NOT SEQUENCE VALUE IN T DIRECTION
~	
W(0,0)	WEIGHT
~	
X(0,0)	SPATIAL COORDINATE VALUE OF EACH CONTROL POINT(X)
Y(0,0)	SPATIAL COORDINATE VALUE OF EACH CONTROL POINT(Y)
Z(0,0)	SPATIAL COORDINATE VALUE OF EACH CONTROL POINT(Z)
~	
U(0)	START VALUE IN S DIRECTION
U(1)	END VALUE IN S DIRECTION
V(0)	START VALUE IN T DIRECTION
V(1)	END VALUE IN T DIRECTION

FIG. 7

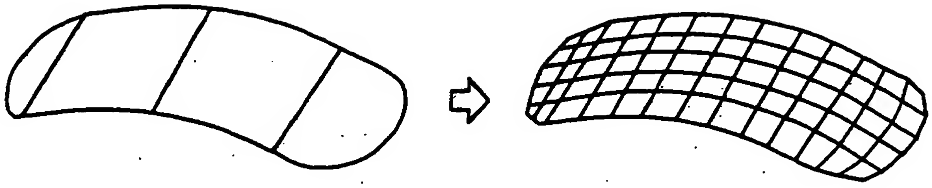


FIG. 8

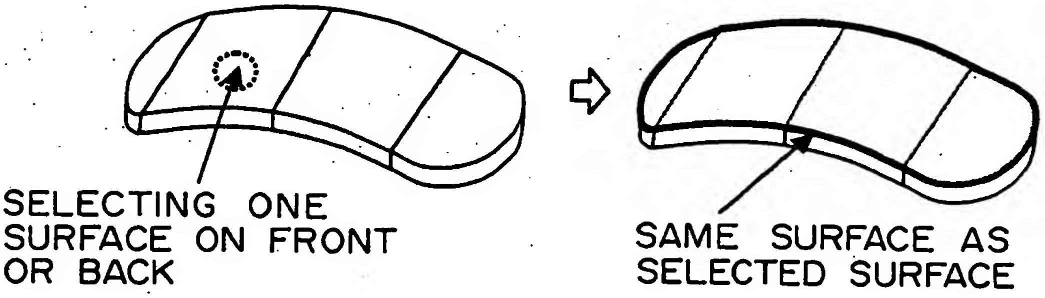

SELECTING ONE SURFACE ON FRONT OR BACK
SAME SURFACE AS SELECTED SURFACE

FIG. 9

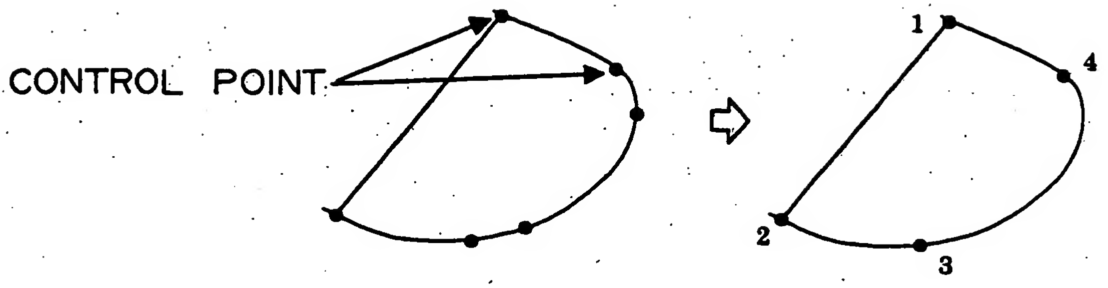


FIG. 10

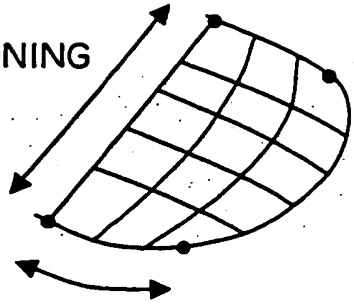


FIG. 11

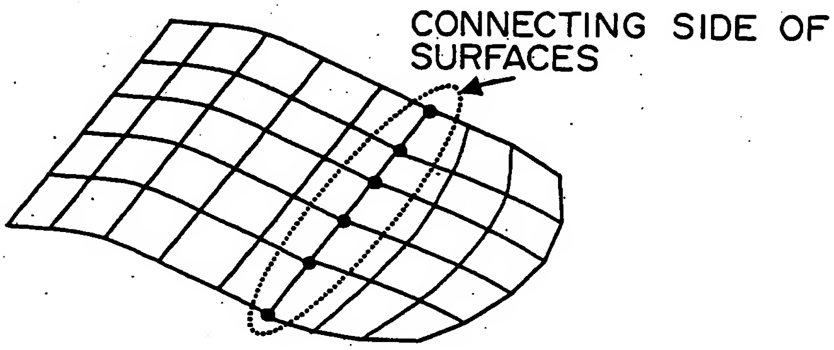


FIG. 12

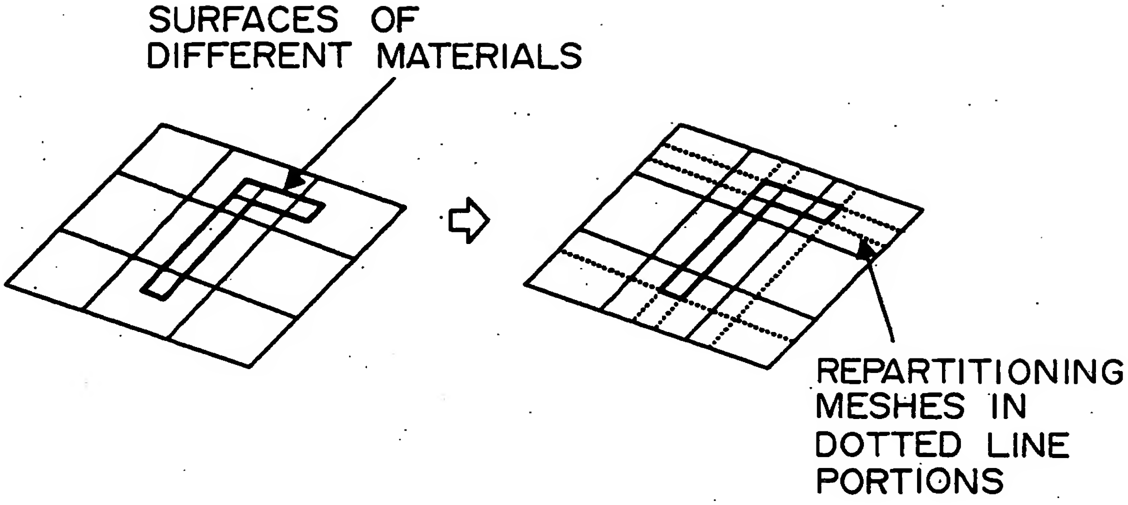

SURFACES OF
DIFFERENT MATERIALS
REPARTITIONING
MESHES IN
DOTTED LINE
PORTIONS

FIG. 13

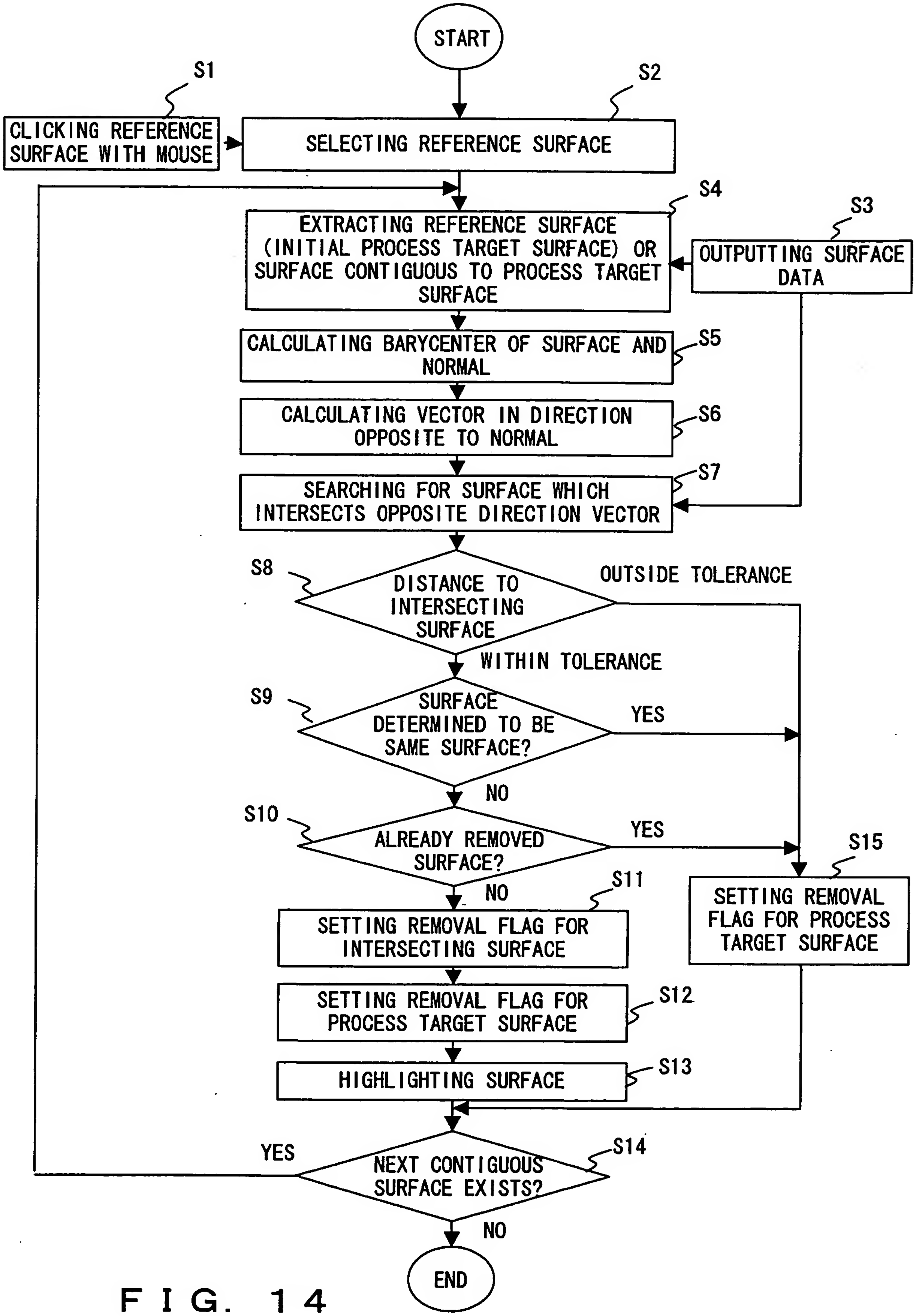

START
S1
CLICKING REFERENCE SURFACE WITH MOUSE
S2
SELECTING REFERENCE SURFACE
S4
EXTRACTING REFERENCE SURFACE (INITIAL PROCESS TARGET SURFACE) OR SURFACE CONTIGUOUS TO PROCESS TARGET SURFACE
S3
OUTPUTTING SURFACE DATA
CALCULATING BARYCENTER OF SURFACE AND NORMAL
S5
CALCULATING VECTOR IN DIRECTION OPPOSITE TO NORMAL
S6
SEARCHING FOR SURFACE WHICH INTERSECTS OPPOSITE DIRECTION VECTOR
S7
S8
DISTANCE TO INTERSECTING SURFACE
OUTSIDE TOLERANCE
WITHIN TOLERANCE
S9
SURFACE DETERMINED TO BE SAME SURFACE?
YES
NO
S10
ALREADY REMOVED SURFACE?
YES
S15
NO
S11
SETTING REMOVAL FLAG FOR INTERSECTING SURFACE
SETTING REMOVAL FLAG FOR PROCESS TARGET SURFACE
SETTING REMOVAL FLAG FOR PROCESS TARGET SURFACE
S12
HIGHLIGHTING SURFACE
S13
YES
NEXT CONTIGUOUS SURFACE EXISTS?
S14
NO
END

FIG. 14

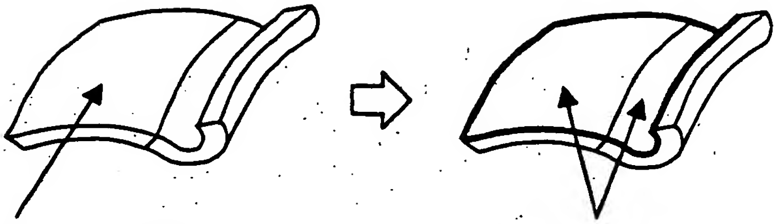

SELECTING REFERENCE SURFACE
SURFACE DETERMINED TO BE SAME SURFACE AS REFERENCE SURFACE

FIG. 15

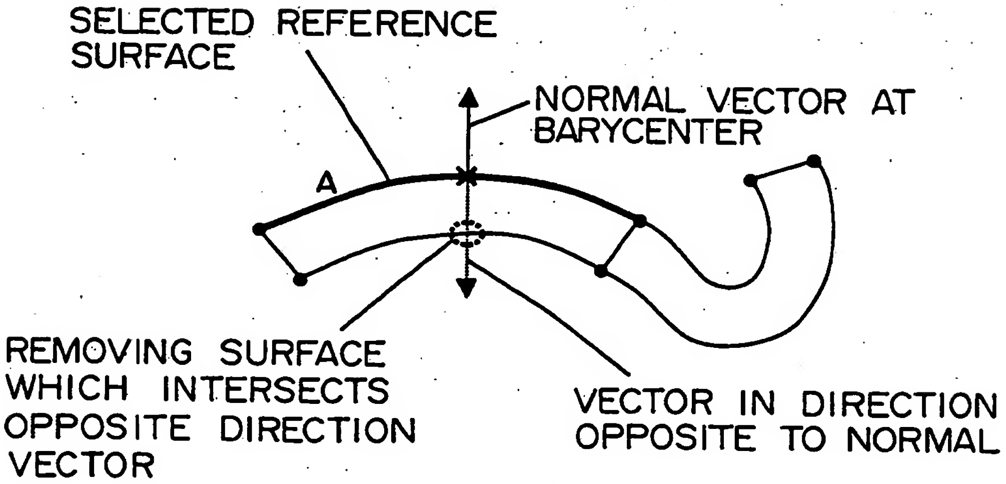

SELECTED REFERENCE SURFACE
NORMAL VECTOR AT BARYCENTER
A
REMOVING SURFACE WHICH INTERSECTS OPPOSITE DIRECTION VECTOR
VECTOR IN DIRECTION OPPOSITE TO NORMAL

FIG. 16

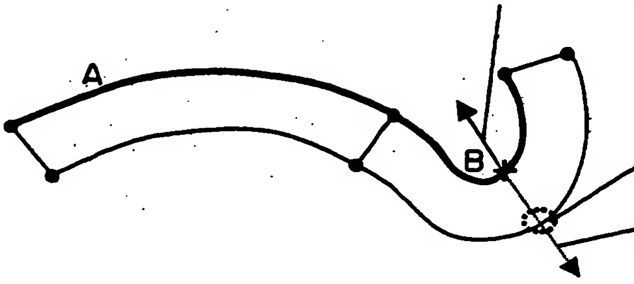
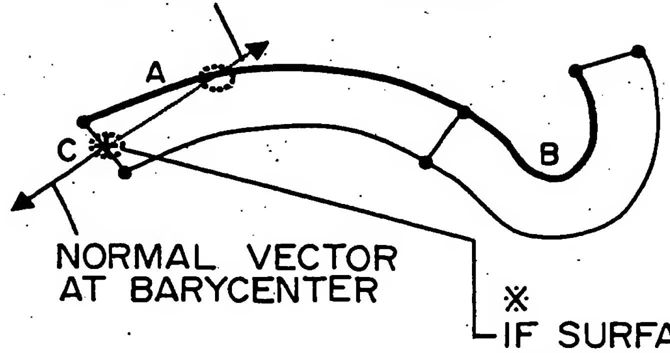

NORMAL VECTOR AT BARYCENTER
REMOVING SURFACE WHICH INTERSECTS OPPOSITE DIRECTION VECTOR
VECTOR IN DIRECTION OPPOSITE TO NORMAL
A
B

FIG. 17

VECTOR IN DIRECTION OPPOSITE TO NORMAL



NORMAL VECTOR AT BARYCENTER

※
IF SURFACE INTERSECTING OPPOSITE DIRECTION VECTOR IS SURFACE WHICH HAS ALREADY DETERMINED TO BE SAME SURFACE, SIDE C ITSELF IS REMOVED

FIG. 18

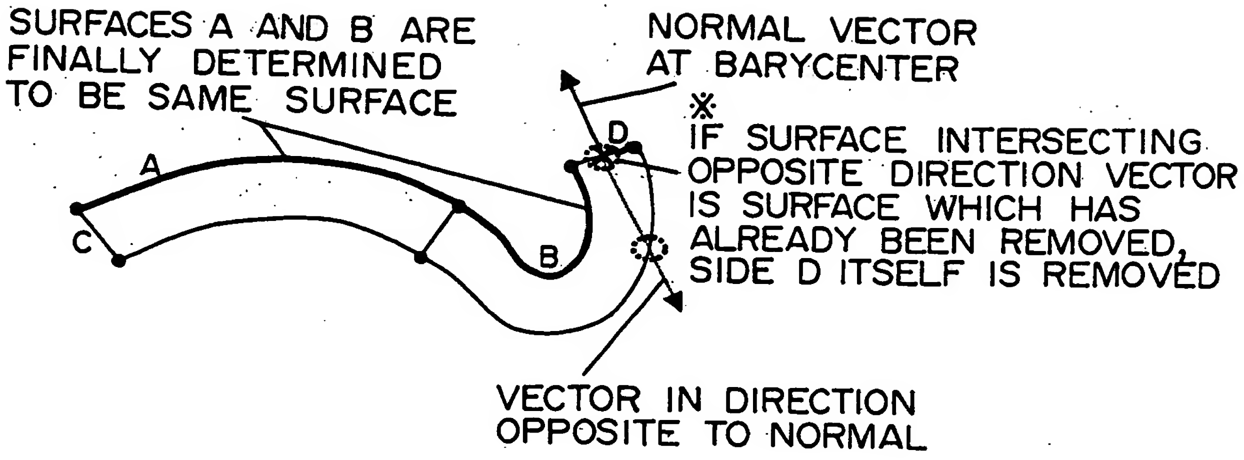

SURFACES A AND B ARE FINALLY DETERMINED TO BE SAME SURFACE
NORMAL VECTOR AT BARYCENTER
※ IF SURFACE INTERSECTING OPPOSITE DIRECTION VECTOR IS SURFACE WHICH HAS ALREADY BEEN REMOVED, SIDE D ITSELF IS REMOVED
A
B
C
D
VECTOR IN DIRECTION OPPOSITE TO NORMAL

FIG. 19

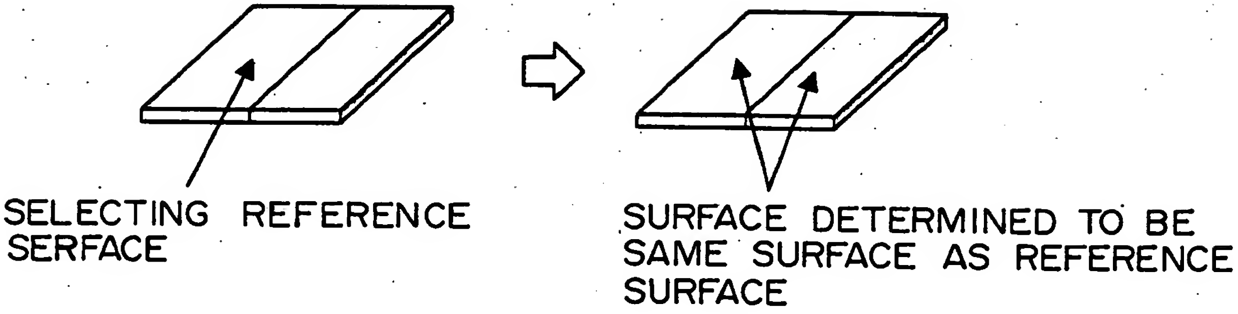

SELECTING REFERENCE SERFACE
SURFACE DETERMINED TO BE SAME SURFACE AS REFERENCE SURFACE

FIG. 20

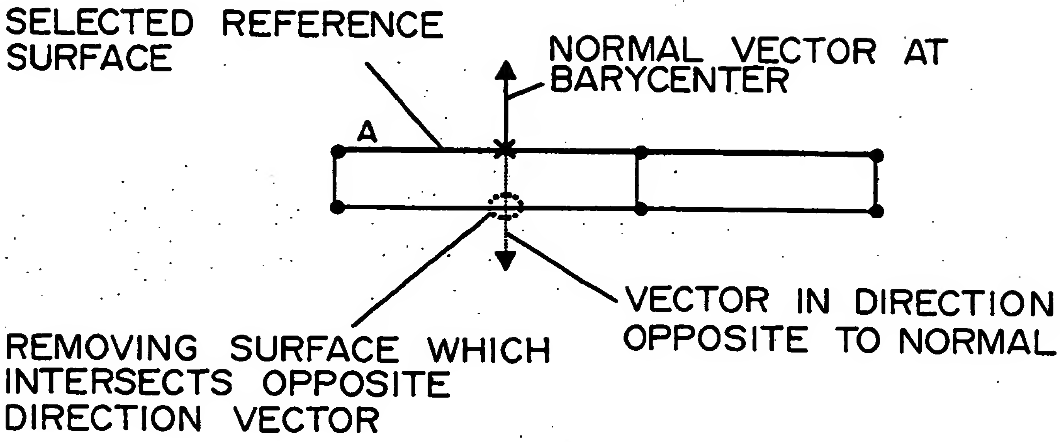

SELECTED REFERENCE SURFACE
NORMAL VECTOR AT BARYCENTER
A
VECTOR IN DIRECTION OPPOSITE TO NORMAL
REMOVING SURFACE WHICH INTERSECTS OPPOSITE DIRECTION VECTOR

FIG. 21

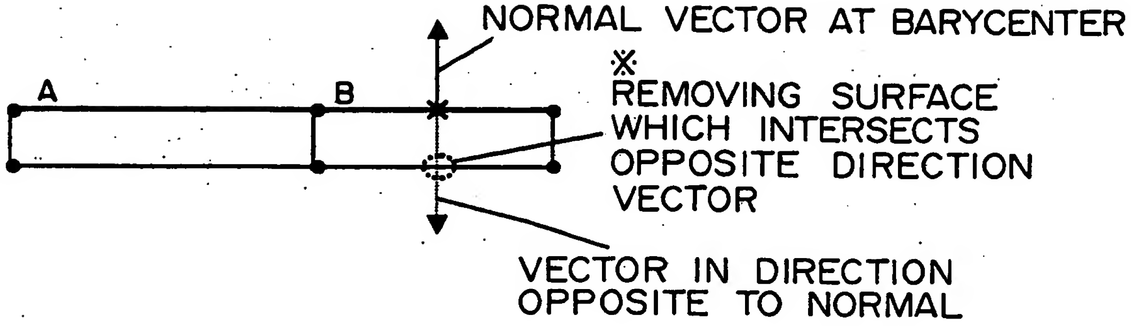

NORMAL VECTOR AT BARYCENTER
A
B
※
REMOVING SURFACE
WHICH INTERSECTS
OPPOSITE DIRECTION
VECTOR
VECTOR IN DIRECTION
OPPOSITE TO NORMAL

FIG. 22

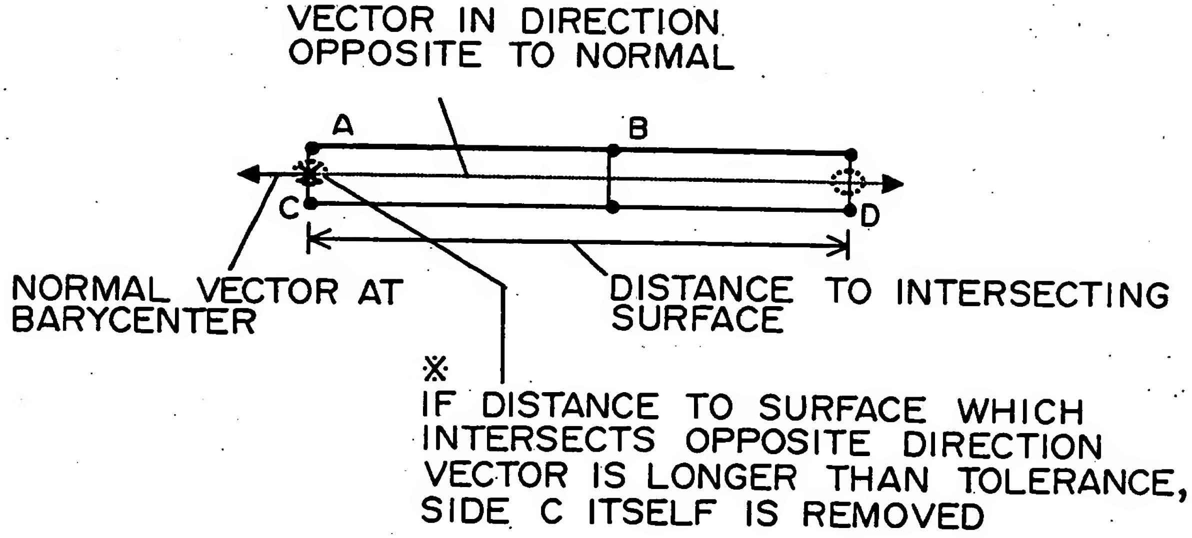

VECTOR IN DIRECTION OPPOSITE TO NORMAL
A
B
C
D
NORMAL VECTOR AT BARYCENTER
DISTANCE TO INTERSECTING SURFACE
※
IF DISTANCE TO SURFACE WHICH INTERSECTS OPPOSITE DIRECTION VECTOR IS LONGER THAN TOLERANCE, SIDE C ITSELF IS REMOVED

FIG. 23

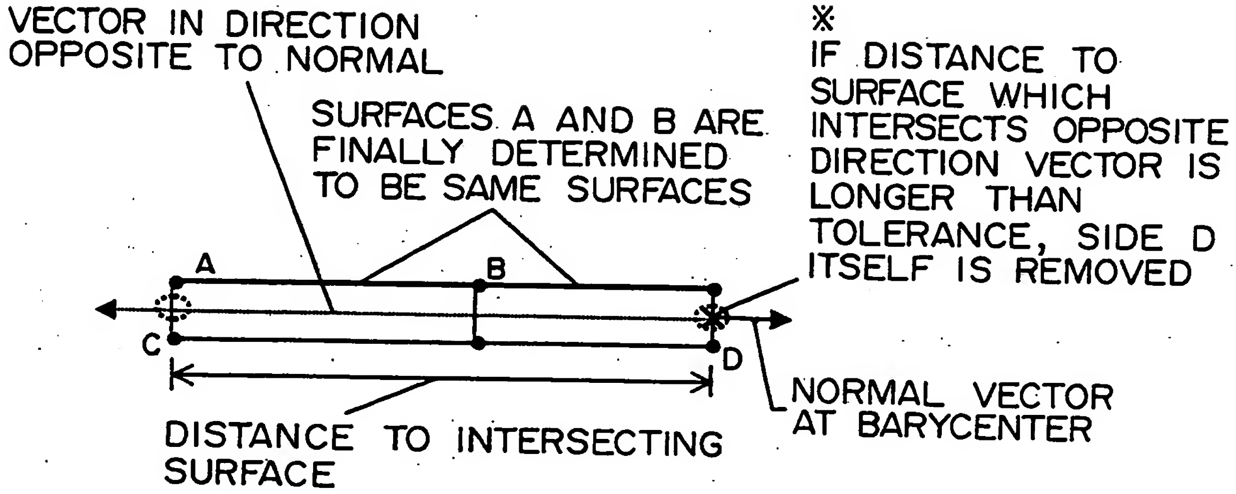
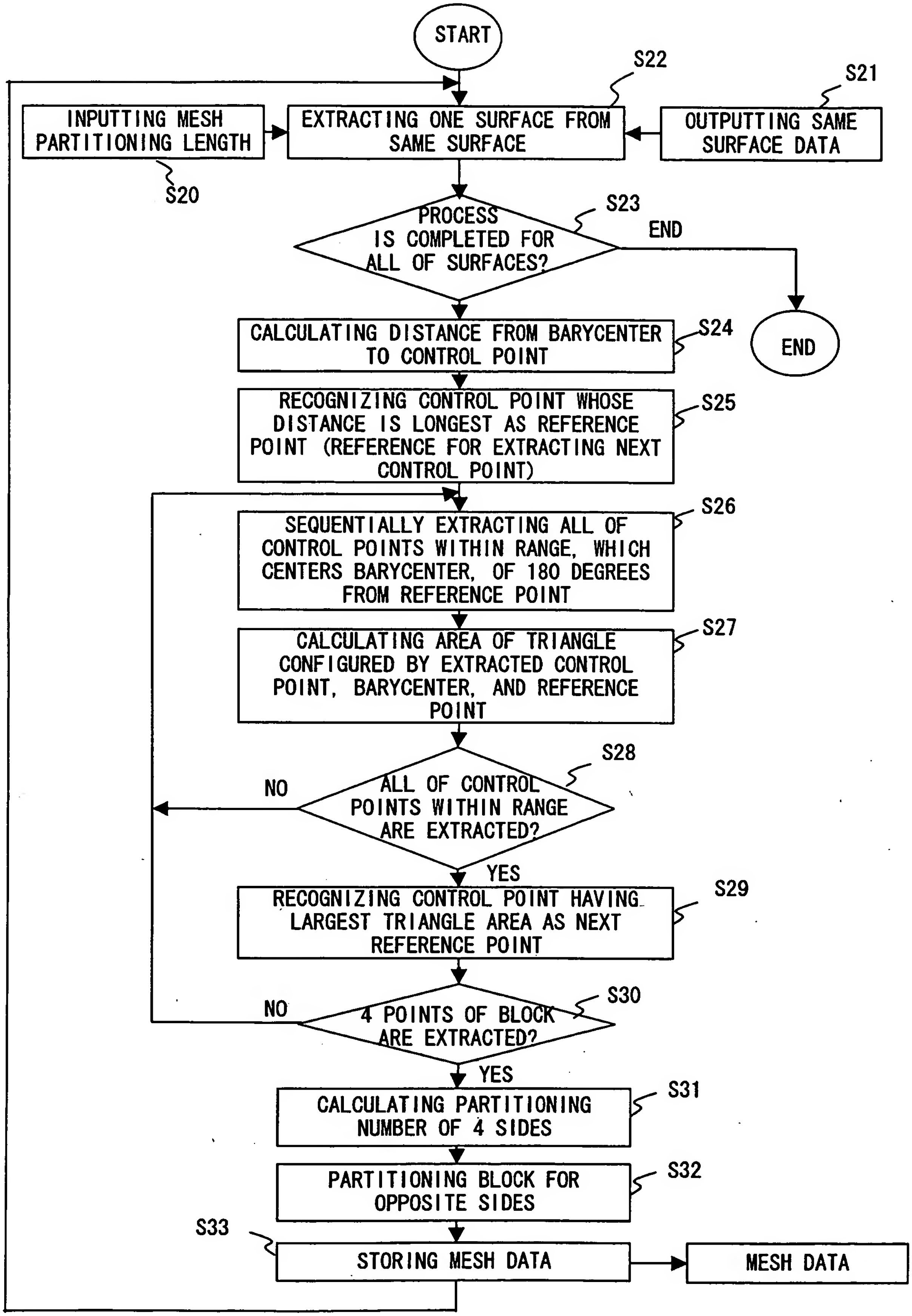

VECTOR IN DIRECTION OPPOSITE TO NORMAL
SURFACES A AND B ARE FINALLY DETERMINED TO BE SAME SURFACES
※ IF DISTANCE TO SURFACE WHICH INTERSECTS OPPOSITE DIRECTION VECTOR IS LONGER THAN TOLERANCE, SIDE D ITSELF IS REMOVED
A
B
C
D
NORMAL VECTOR AT BARYCENTER
DISTANCE TO INTERSECTING SURFACE

FIG. 24


START
S22
S21
INPUTTING MESH PARTITIONING LENGTH
EXTRACTING ONE SURFACE FROM SAME SURFACE
OUTPUTTING SAME SURFACE DATA
S20
PROCESS IS COMPLETED FOR ALL OF SURFACES?
S23
END
CALCULATING DISTANCE FROM BARYCENTER TO CONTROL POINT
S24
END
RECOGNIZING CONTROL POINT WHOSE DISTANCE IS LONGEST AS REFERENCE POINT (REFERENCE FOR EXTRACTING NEXT CONTROL POINT)
S25
SEQUENTIALLY EXTRACTING ALL OF CONTROL POINTS WITHIN RANGE, WHICH CENTERS BARYCENTER, OF 180 DEGREES FROM REFERENCE POINT
S26
CALCULATING AREA OF TRIANGLE CONFIGURED BY EXTRACTED CONTROL POINT, BARYCENTER, AND REFERENCE POINT
S27
S28
NO
ALL OF CONTROL POINTS WITHIN RANGE ARE EXTRACTED?
YES
RECOGNIZING CONTROL POINT HAVING LARGEST TRIANGLE AREA AS NEXT REFERENCE POINT
S29
S30
NO
4 POINTS OF BLOCK ARE EXTRACTED?
YES
CALCULATING PARTITIONING NUMBER OF 4 SIDES
S31
PARTITIONING BLOCK FOR OPPOSITE SIDES
S32
S33
STORING MESH DATA
MESH DATA

F I G. 2 5

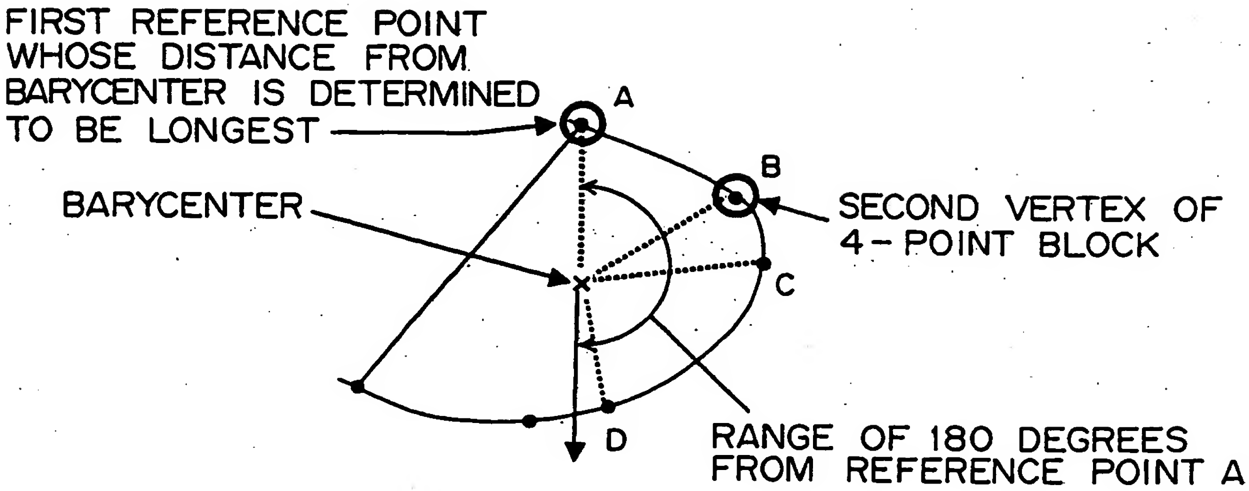

FIRST REFERENCE POINT WHOSE DISTANCE FROM BARYCENTER IS DETERMINED TO BE LONGEST
A
B
BARYCENTER
SECOND VERTEX OF 4-POINT BLOCK
C
D
RANGE OF 180 DEGREES FROM REFERENCE POINT A

FIG. 26

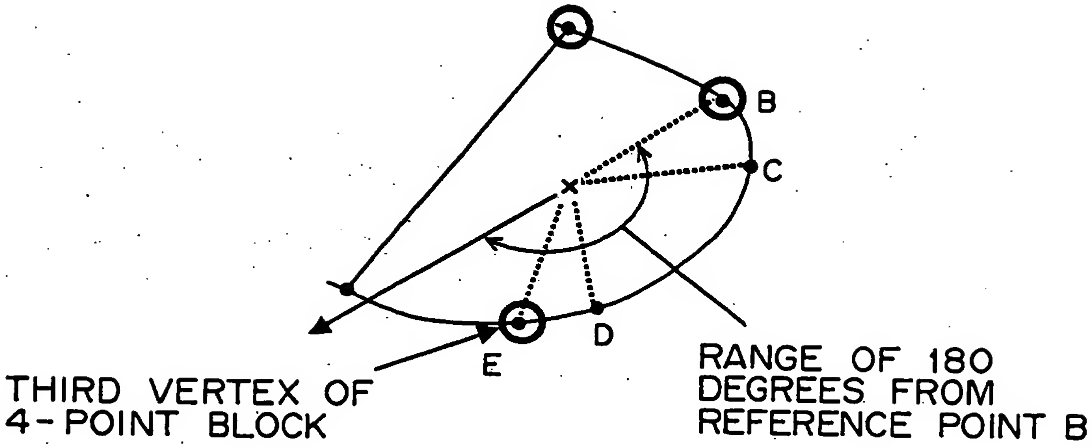

B
C
D
E
THIRD VERTEX OF 4-POINT BLOCK
RANGE OF 180 DEGREES FROM REFERENCE POINT B

FIG. 27

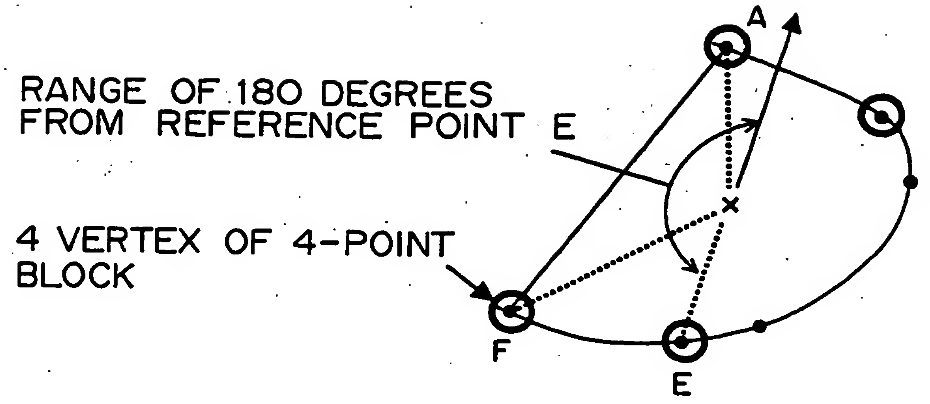
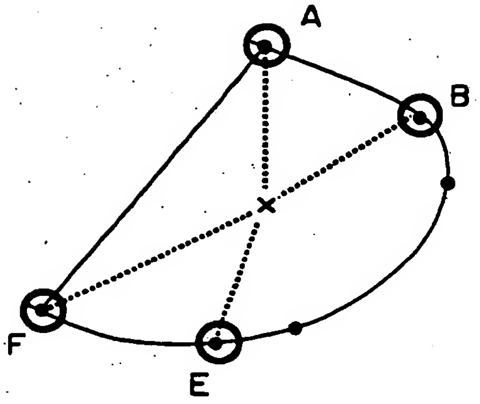

RANGE OF 180 DEGREES FROM REFERENCE POINT E
4 VERTEX OF 4-POINT BLOCK
A
F
E

FIG. 28



○ 4 CIRCLED POINTS FINALLY REMAIN

FIG. 29

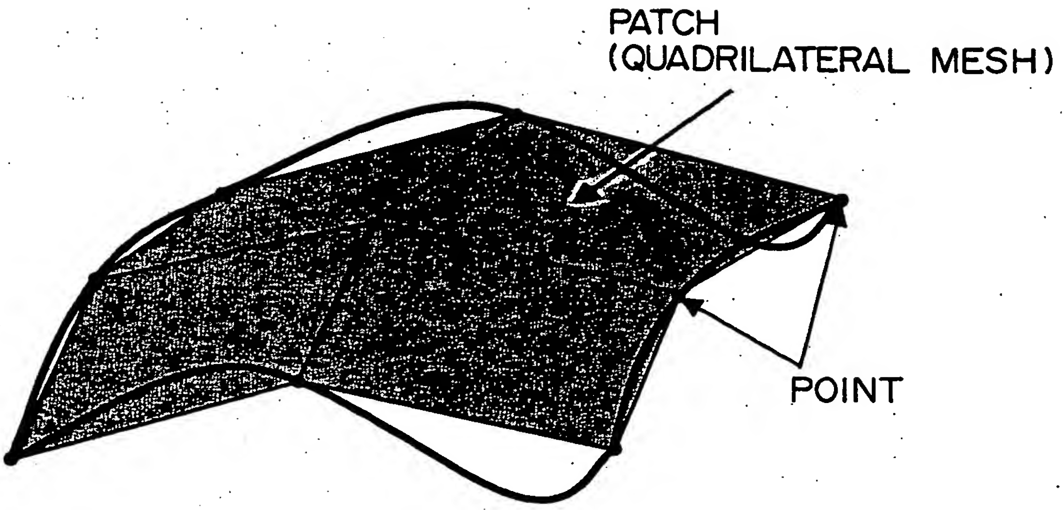


FIG. 30

COORDINATE SPECIFICATION DATA OF POLYGON VERTEX: $point

<KEYWORD・STATEMENT>
$point

<DATA・STATEMENT>

Point no.	POINT NUMBER
X	X COORDINATE VALUE
Y	Y COORDINATE VALUE
Z	Z COORDINATE VALUE

<DESCRIPTION EXAMPLE>
```
$point
1    0.035  0.012  0.8
```

SPECIFICATION DATA OF POLYGON CONFIGURING POINT: $patch

<KEYWORD・STATEMENT>
$patch

<DATA・STATEMENT>

Patch no.	PATCH NUMBER
Point 1	POINT NUMBER WHICH BECOMES FIRST CONFIGURING POINT OF PATCH
Point 2	POINT NUMBER WHICH BECOMES SECOND CONFIGURING POINT OF PATCH
Point 3	POINT NUMBER WHICH BECOMES THIRD CONFIGURING POINT OF PATCH
Point 4	POINT NUMBER WHICH BECOMES FOURTH CONFIGURING POINT OF PATCH

<DESCRIPTION EXAMPLE>
```
$patch
1   10    11    12    13
```

FIG. 31

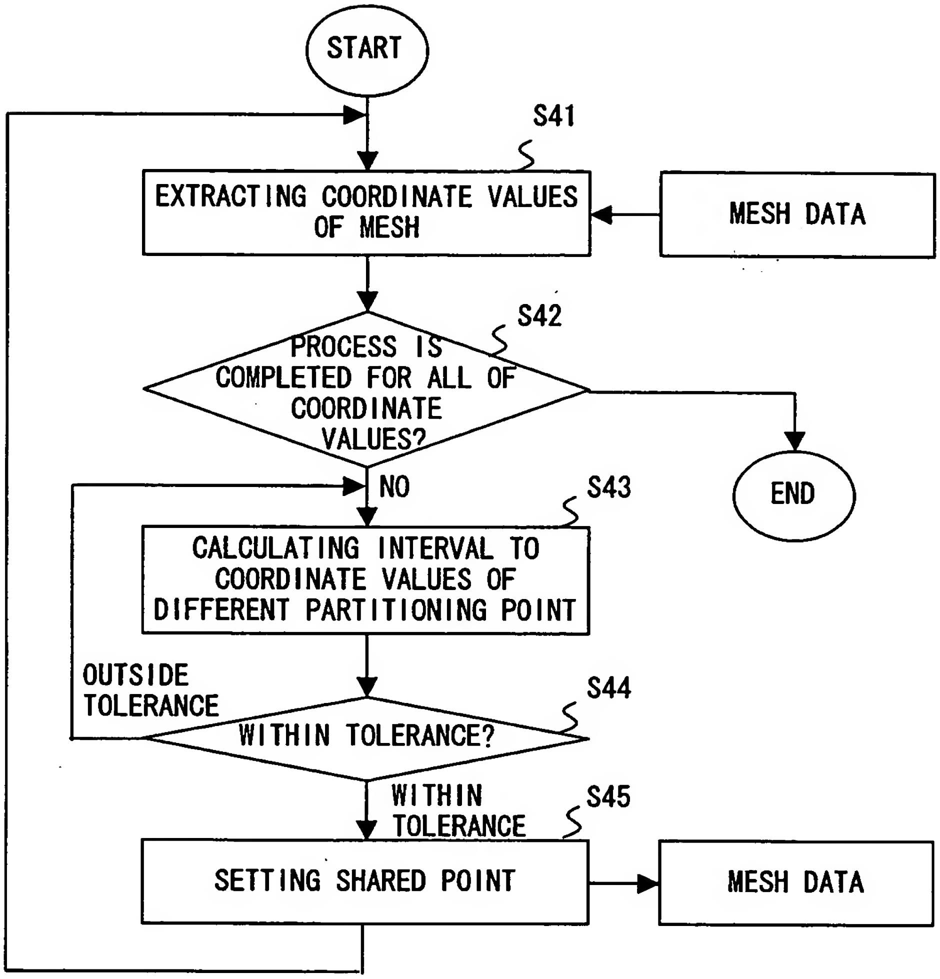

START
S41
EXTRACTING COORDINATE VALUES OF MESH
MESH DATA
S42
PROCESS IS COMPLETED FOR ALL OF COORDINATE VALUES?
END
NO
S43
CALCULATING INTERVAL TO COORDINATE VALUES OF DIFFERENT PARTITIONING POINT
OUTSIDE TOLERANCE
S44
WITHIN TOLERANCE?
WITHIN TOLERANCE
S45
SETTING SHARED POINT
MESH DATA

FIG. 32

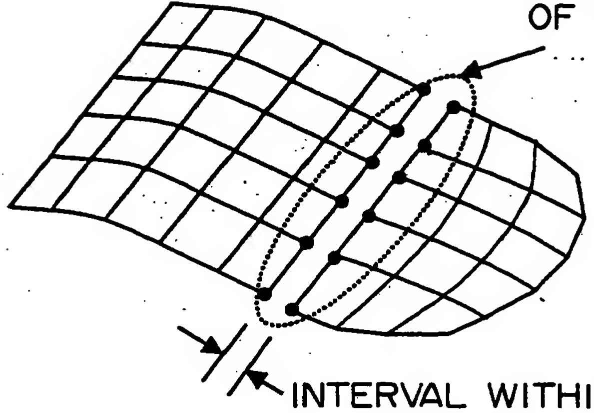


FIG. 33

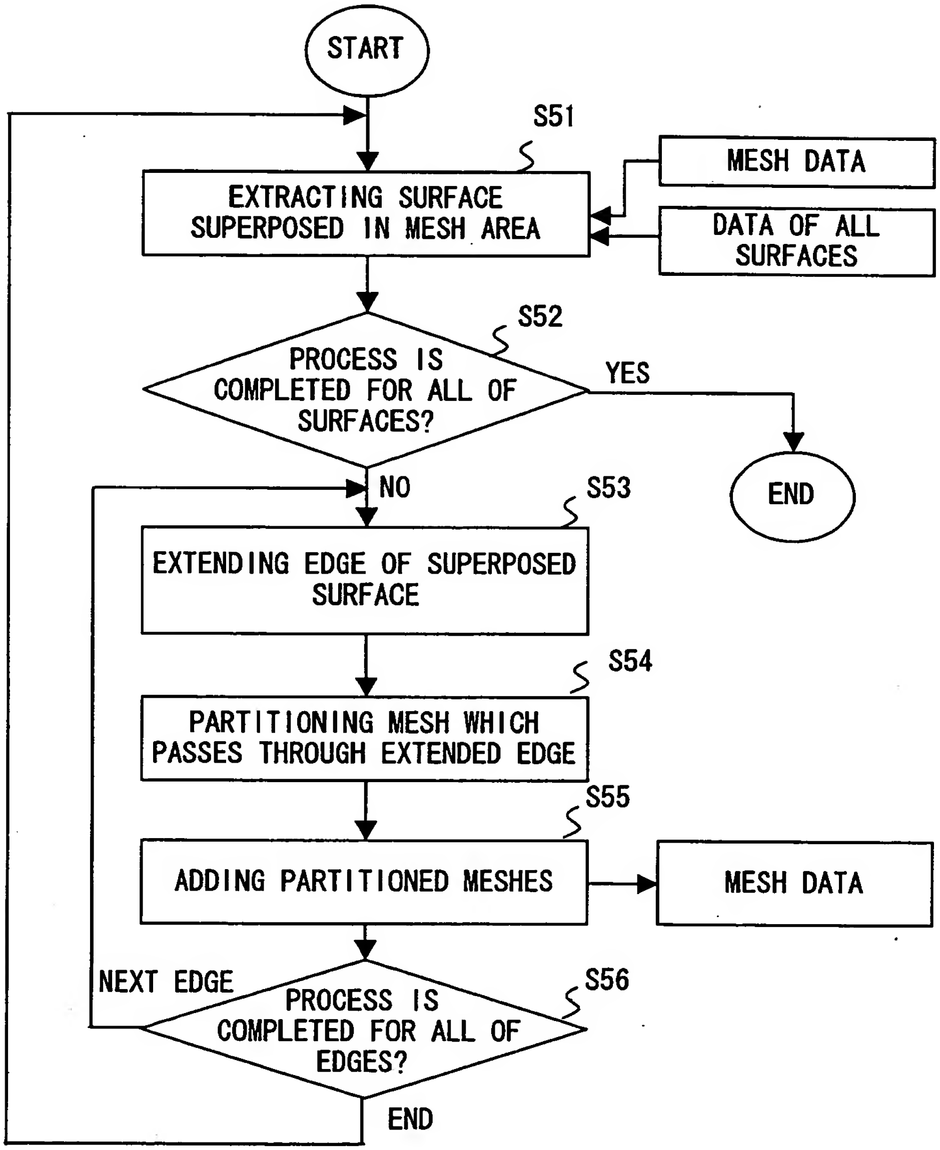

START
S51
EXTRACTING SURFACE SUPERPOSED IN MESH AREA
MESH DATA
DATA OF ALL SURFACES
S52
PROCESS IS COMPLETED FOR ALL OF SURFACES?
YES
END
NO
S53
EXTENDING EDGE OF SUPERPOSED SURFACE
S54
PARTITIONING MESH WHICH PASSES THROUGH EXTENDED EDGE
S55
ADDING PARTITIONED MESHES
MESH DATA
NEXT EDGE
S56
PROCESS IS COMPLETED FOR ALL OF EDGES?
END

FIG. 34

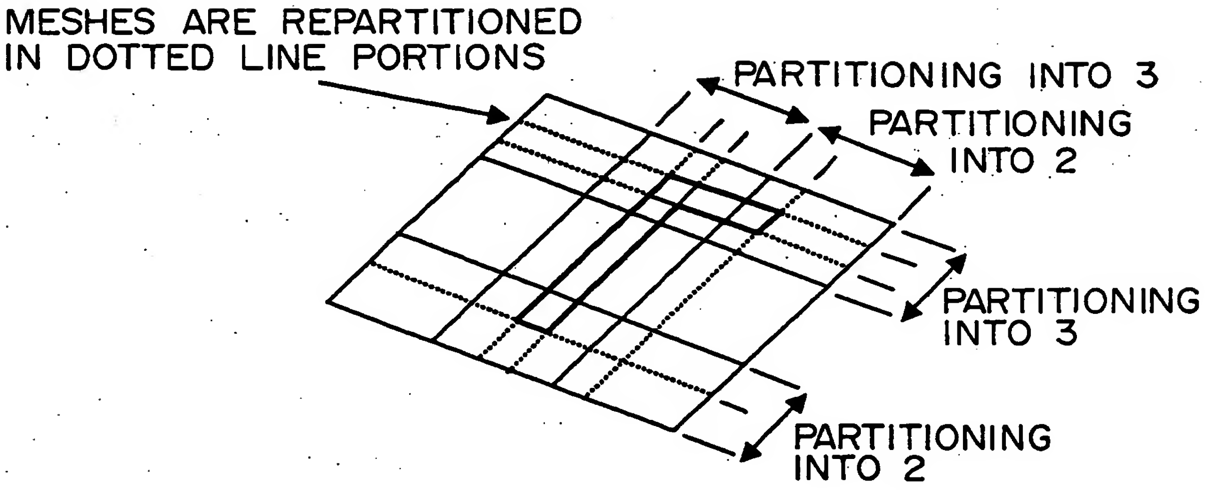

MESHES ARE REPARTITIONED IN DOTTED LINE PORTIONS
PARTITIONING INTO 3
PARTITIONING INTO 2
PARTITIONING INTO 3
PARTITIONING INTO 2

FIG. 35

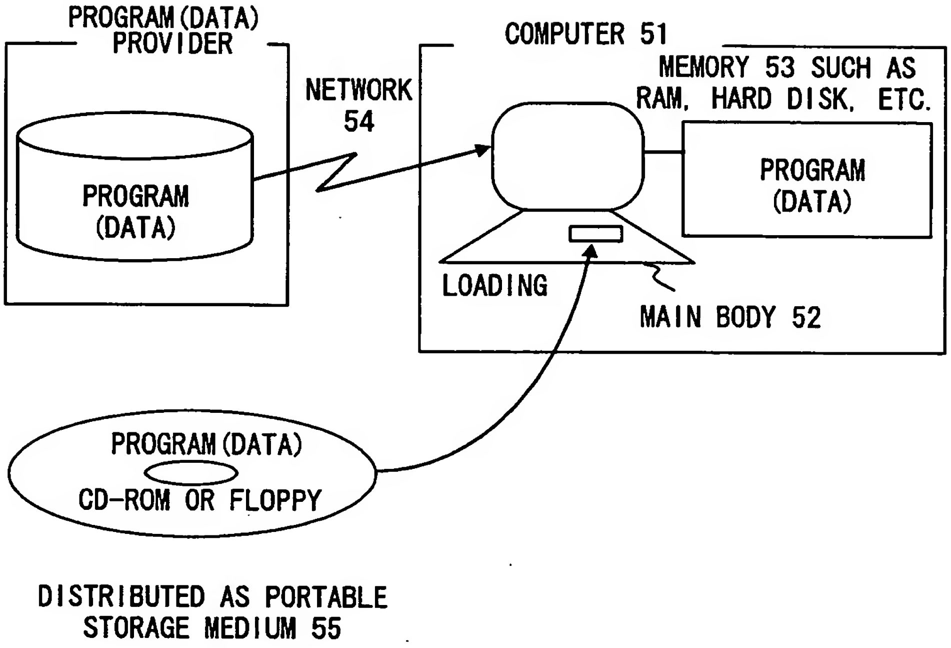

PROGRAM (DATA) PROVIDER
PROGRAM (DATA)
NETWORK 54
COMPUTER 51
MEMORY 53 SUCH AS RAM, HARD DISK, ETC.
PROGRAM (DATA)
LOADING
MAIN BODY 52
PROGRAM (DATA)
CD-ROM OR FLOPPY
DISTRIBUTED AS PORTABLE STORAGE MEDIUM 55

FIG. 36